

CLAIMS

What is claimed is:

1. A method of forming a foam product comprising the
5 steps of:
forming a layer of uncured thermosetting polyurethane foam;
applying to said layer of uncured foam a layer of bubble pack
made of thermoplastic polyurethane, such that the bubbles that extend
outwardly from said bubble pack at least partially penetrate into said uncured
10 foam; and
curing said layer of uncured thermosetting polyurethane foam,
whereby said thermosetting polyurethane foam chemically bonds to said
thermoplastic polyurethane bubble pack.
- 15 2. The method of Claim 1, wherein said bubbles that
extend outwardly from said bubble pack substantially completely penetrate
into said uncured foam
- 20 3. The method of Claim 1, wherein said thermosetting
polyurethane foam is about 1 to 10 mm in thickness.
4. The method of Claim 1, wherein said thermosetting
polyurethane foam is about 2 to 5 mm in thickness.
- 25 5. The method of Claim 1, wherein said thermosetting
polyurethane foam is cured by heating it to a temperature of about 110° to
325°F.

6. A method of forming a foam product comprising the steps of:

applying to a layer of bubble pack made of thermoplastic polyurethane a layer of frothed, uncured thermosetting polyurethane foam, such that bubbles that extend outwardly from said bubble pack are at least partially surrounded by said uncured foam; and

curing said layer of uncured thermosetting polyurethane foam, whereby said thermosetting polyurethane foam chemically bonds to said thermoplastic polyurethane bubble pack.

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7. The method of Claim 6, wherein said bubbles that extend outwardly from said bubble pack substantially completely penetrate into said uncured foam

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8. The method of Claim 6, wherein said thermosetting polyurethane foam is about 1 to 10 mm in thickness.

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9. The method of Claim 6, wherein said thermosetting polyurethane foam is about 2 to 5 mm in thickness.

10. The method of Claim 6, wherein said thermosetting polyurethane foam is cured by heating it to a temperature of about 110° to 325°F.

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11. A method of forming a foam product comprising the steps of:

forming a layer of frothed, uncured thermosetting polyurethane foam, said layer of foam having a first surface and a second surface;

applying to said first surface of said layer of uncured foam a layer of bubble pack made of thermoplastic polyurethane, said bubble pack having a plurality of bubbles that project outwardly from said layer;

applying pressure to said layer of uncured polymeric foam and said layer of bubble pack so that said uncured polymeric foam at least partially surrounds each bubble of said plurality of outwardly projecting bubbles; and

applying to said second surface heat of a temperature and for a time sufficient to cure said layer of uncured polymeric foam, but not sufficient to adversely affect said layer of bubble pack.

12. The method of Claim 11, wherein said uncured polymeric foam substantially completely surrounds each bubble of said plurality of outwardly projecting bubbles.

13. The method of Claim 11, wherein said thermosetting polyurethane foam is about 1 to 10 mm in thickness.

14. The method of Claim 11, wherein said thermosetting polyurethane foam is about 2 to 5 mm in thickness.

15. The method of Claim 11, wherein said thermosetting polyurethane foam is cured by heating it to a temperature of about 110° to 325°F.

16. A method of forming a foam product comprising the steps of:

applying to a substrate a layer of frothed, uncured thermosetting polyurethane foam;

5 applying to said layer of uncured foam on said substrate a layer of bubble pack made of thermoplastic polyurethane, such that bubbles that extend outwardly from said bubble pack at least partially penetrate into said uncured foam; and

10 curing said layer of uncured foam to form a laminate comprising said substrate, said cured foam and said bubble pack.

17. The method of Claim 16, wherein said substrate is a fabric.

15 18. The method of Claim 16, wherein said substrate is a carpet.

19. The method of Claim 16, wherein said substrate is paper.

20 20. The method of Claim 16, wherein said substrate is a plastic film.

21. The method of Claim 20, wherein said plastic film is
25 selected from polyurethane, polyethylene and polypropylene.

22. A method of forming a foam product comprising the steps of:

applying to a layer of bubble pack made from thermoplastic polyurethane a layer of frothed, uncured thermosetting polyurethane foam, such that bubbles that extend outwardly from said bubble pack are at least partially surrounded by said uncured foam;

applying to said layer of uncured polymeric foam on said bubble pack a substrate; and

curing said layer of uncured polymeric foam.

23. The method of Claim 22, wherein said substrate is a fabric.

24. The method of Claim 22, wherein said substrate is a carpet.

25. The method of Claim 22, wherein said substrate is paper.

26. The method of Claim 22, wherein said substrate is a plastic film.

27. The method of Claim 22, wherein said film is selected from polyurethane, polyethylene and polypropylene.

28. The product of Claim 1.

29. The product of Claim 6.

30. The product of Claim 11.

31. The product of Claim 16.

32. The product of Claim 22.

33. A product comprising a layer of thermosetting polyurethane foam bonded to a layer of bubble pack made from thermoplastic polyurethane, wherein said layer of foam surrounds at least a portion of each
 5 bubble of a plurality of bubbles that project outwardly from said bubble pack layer.

34. The product of Claim 33, wherein said thermosetting polyurethane foam has a density of between approximately 2 and 30 pounds
 10 per cubic foot.

35. A shoe insole comprising a layer of thermosetting polyurethane foam bonded to a layer of bubble pack made from thermoplastic polyurethane, wherein said layer of foam surrounds at least a portion of each
 15 bubble of a plurality of bubbles that project outwardly from said bubble pack layer.

36. A carpet comprising:
 a backing layer;
 20 tufts of yarn extending through said backing layer to form a face pile on one side of said backing layer;
 a layer of thermosetting polyurethane foam attached to the side of said backing layer opposite said face pile; and
 a layer of bubble pack made from thermoplastic
 25 polyurethane bonded to said layer of foam, wherein said layer of foam surrounds at least a portion of each bubble of a plurality of bubbles that project outwardly from said bubble pack layer.

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37. A product comprising:

a layer of fabric;

a layer of thermosetting polyurethane foam attached to one side of said fabric layer; and

5 a layer of bubble pack made from thermoplastic polyurethane bonded to said layer of foam on said fabric layer, wherein said layer of foam surrounds at least a portion of each bubble of a plurality of bubbles that project outwardly from said bubble pack layer.

10 38. A method of making a shoe insole comprising the steps of:

applying to a fabric substrate a layer of frothed, uncured thermosetting polyurethane foam;

15 applying to said layer of uncured foam on said fabric substrate a layer of bubble pack made of thermoplastic polyurethane, such that bubbles that extend outwardly from said bubble pack at least partially penetrate into said uncured foam;

curing said layer of uncured foam to form a laminated structure comprising said substrate, said cured foam and said bubble pack; and

20 cutting a plurality of shoe insoles out of said laminated structure.

39. The process of Claim 38, wherein said shoe insoles are cut from said laminate structure using a heated cutting die.

25 40. The process of Claim 38, wherein said process is carried out on a continuous basis.

41. A method of forming a product comprising the steps of:
applying to a layer of bubble pack having a plurality of
bubbles that extend outwardly from said bubble pack and also have interstices
between adjacent bubbles a viscoelastic composition, such that the viscoelastic
5 composition at least partially fills the interstices of said bubble pack; and
curing said viscoelastic composition.

42. The method of Claim 1, wherein said bubble pack is
made from a plastic material selected from polyurethane, polyethylene and
10 polypropylene.

43. The method of Claim 1, wherein said bubble pack is
made from thermoplastic polyurethane.

44. The method of Claim 1, wherein said viscoelastic
15 composition substantially fills the interstices of said bubble pack

45. The method of Claim 1, wherein said viscoelastic
composition is a viscoelastic polyurethane composition.
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46. The method of Claim 1, wherein said bubble pack is
about 3/32 to 1 inch in thickness.

47. The method of Claim 1, wherein said viscoelastic
25 composition is cured by heating it to a temperature of about 110° to 325° F.

48. A method of forming a product comprising the steps of:
applying to a layer of bubble pack having a plurality of
bubbles that extend outwardly from said bubble pack and also have interstices
30 between adjacent bubbles a viscoelastic composition, such that the viscoelastic
composition at least partially fills the interstices of said bubble pack; and
curing said viscoelastic composition.

49. The method of Claim 24, wherein said substrate is a fabric.

50. The method of Claim 24, wherein said substrate is a
5 carpet.

51. The method of Claim 24, wherein said substrate is paper.

52. The method of Claim 24, wherein said substrate is a
10 plastic film.

53. The method of Claim 24, wherein said plastic film is
selected from polyurethane, polyethylene and polypropylene.
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54. A product comprising a layer of bubble pack having a
plurality of bubbles that extend outwardly from said bubble pack and also
have interstices between adjacent bubbles, said interstices being at least
partially filled with a viscoelastic composition.
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55. The product of Claim 30, wherein said viscoelastic
composition is a viscoelastic polyurethane composition.

56. The product of Claim 30, wherein said viscoelastic
25 polyurethane foam has a density of between approximately 40 and 80 pounds
per cubic foot.

57. The product of Claim 30 further comprising a substrate
attached to said viscoelastic composition.
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58. A shoe insole comprising:

a layer of bubble pack having a plurality of bubbles that extend outwardly from said bubble pack and also have interstices between adjacent bubbles, said interstices being at least partially filled with a viscoelastic composition; and
a substrate attached to said viscoelastic composition.

59. A method of making a shoe insole comprising the steps of:

applying to a fabric substrate a layer of uncured viscoelastic polyurethane;

applying to said layer of uncured viscoelastic polyurethane on said fabric substrate a layer of bubble pack, said bubble pack having a plurality of bubbles that extend outwardly therefrom and interstices between adjacent bubbles, such that said viscoelastic polyurethane at least partially fills said interstices;

curing said viscoelastic polyurethane to form a laminated structure comprising said substrate, said cured viscoelastic polyurethane and said bubble pack; and

cutting a plurality of shoe insoles out of said laminated structure.

60. The process of Claim 35, wherein said process is carried out on a continuous basis.

61. A method of making a shoe insole comprising the steps of:

applying to a layer of bubble pack having a plurality of bubbles that extend outwardly therefrom and interstices between adjacent
5 bubbles, a layer of uncured viscoelastic polyurethane such that said viscoelastic polyurethane at least partially fills said interstices;

curing said viscoelastic polyurethane to form a laminated structure comprising said cured viscoelastic polyurethane and said bubble pack; and
10 cutting a plurality of shoe insoles out of said laminated structure.

62. The process of Claim 37, wherein said process is carried out on a continuous basis.

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